# Mortality Management Options for Georgia Poultry Growers

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Poultry production facilities must deal with the disposal of farm mortalities on a daily basis. Death loss in animal production is an unfortunate reality that requires appropriate handling to prevent the spread of disease, the potential for odor and pest problems, and the possible contamination of surface and ground water. A typical flock of 25,000 broilers averaging 5% total mortality will produce approximately 1.6 tons of carcases during a 6 week growing period. This can represent a significant carcass disposal challenge over the life of the flock. A convenient, sanitary, rapid disposal system is critical for mortality management to be practical and effective and meet state and local regulations. Georgia law requires that a disposal system be approved by the Georgia Department of Agriculture (GDA) to prevent the spread of disease organisms from dead poultry to healthy flocks. Disposal of mortality is also regulated by the Environmental Protection Division of the Georgia Department of Natural Resources to protect air and water quality.

The safe and appropriate management of poultry mortality begins with selection of the method best suited for your poultry operation. Each method has advantages and disadvantages. Adherence to proper management is the key to the successful use of any method. Regardless of the method used, Georgia law requires disposal of dead poultry within 24 hours of death or discovery.

## MANAGEMENT OPTIONS

Disposal methods available to Georgia poultry producers include:

1. Burial
2. Landfill
3. Composting
4. Incineration
5. Rendering

Environmental requirements, management procedures, costs, and convenience of each system vary and need to be taken into consideration when determining which method is best suited for individual poultry operations.

### Burial

The traditional method of dead bird disposal in Georgia has been the use of burial pits. The pit is the simplest and most convenient method currently available to dispose of mortality. However, concern over potential problems associated with pits have led to development of alternative disposal methods, including composting, incineration, and other methods. Potential health and environmental risks can be associated with burial in the form of pathogen and nutrient pollution of groundwater. Pit residue can also linger for years. Although there have been no documented

cases of soil or water contamination from poultry pits in Georgia, these potential risks may in the future result in additional restrictions or termination of burial as a mortality management method.

GDA personnel must approve the site(s) prior to pit construction. Where permitted, burial pits must be properly sized, located, and constructed to operate satisfactorily. A one foot minimum between the bottom of the pit and seasonal groundwater or any impermeable layer must be met. Soils must be evaluated for suitability prior to pit construction by a certified GDA employee or a certified soil classifier. Clay soils have characteristics that can accommodate pits, not allowing leakage of microbial or chemical pit contents into surrounding soil or water. State statutes outline the location, construction, and operation of burial pits. For example, a typical pit must meet the following requirements:

1. Must be located at least 100 feet from any existing or proposed well, water supply line, or seasonal high water level of any surface water source.
2. Must not be located within the 100-year flood plain.
3. Maximum depth of 8 feet below the land surface.
4. Maximum of 4 feet in width.
5. Minimum of 1 foot above seasonal high groundwater elevation.
6. Must not be located where the ground slope exceeds a moderate grade.
7. Must be sealed to prevent the entry of rodents, insects, and the exit of odors.

The most common method of construction involves using a backhoe to dig a trench. A prefabricated concrete slab with one or two openings is placed over the trench, and the pit is ready for use. The cost for digging plus the slab is minimal, especially as the slab is reusable on a new pit once the old one is filled and covered with dirt. The life of the pit is variable, depending on soil conditions, number of birds loaded into it, and other management factors, but 1-4 years is common. Open pits are not acceptable under any condition. Pre-cast open-bottom septic tanks can be used to develop a concrete disposal pit at relatively low cost.

Over 90% of poultry growers in Georgia have pits as a primary or backup disposal method. If properly located away from a spring area or where ground water collects and sealed by the slab, mortalities will decompose at an effective rate and scavengers are prevented from removing contents.

As the poultry industry in Georgia expands into other areas where limestone or sandy soils are prevalent, problems may occur in soils with little or no clay, especially when high water tables are present, where pit contents may escape into surrounding soil and water. This concern has prompted other states to ban pits despite little or no scientific data regarding either the leakage of pit contents or of soil type influences. None of the alternative methods can easily replace a properly located and constructed pit with regard to cost or ease of use. By properly locating and managing pits, Georgia may be able to maintain this as a viable option in the future.

**Burial in a Landfill**

If losses exceed the capacity of the farm's daily disposal system, taking the birds to a landfill may be a practical alternative. The feasibility of utilizing a landfill will depend on transportation

costs, tipping fees and whether the landfill operation has been approved by the Georgia EPD to dispose of animal carcasses.

**Composting**

Composting is the most widespread method used in states that have banned pits, and is considered by many as the best alternative for mortality management, though more labor intensive than other methods. Composting is a natural process that generates a value-added end-product while keeping nutrients and biosecurity issues on the farm. Correct operation requires a covered area with a concrete or impervious floor and attentive management. Capacity of both the primary and secondary composters should meet or exceed peak disposal requirements. Compost bins need a roof with an overhang to prevent rain from reaching the compost, as well as an impervious floor. Fire protection equipment and water access should be on site. A double layer of fresh active litter/litter cake with 40-60% moisture will function as a starter supply of microorganisms responsible for composting. Carcasses should not be placed within 6 inches from the side walls or tops of bins. Daily mortality should be covered with at least 8-12 inches of litter/litter cake. When full, bins are capped off with an additional 8-12 inches of litter. Primary and secondary compost stacks should not exceed 5 feet in height to prevent compaction and loss of needed oxygen for microbial growth. Temperatures within the compost must be monitored at least every other day and should reach at least 130 degrees F in order to properly decompose carcasses and neutralize pathogens. A probe type thermometer can be used to measure and plot temperature profile of the compost to assist in determining the need for additional aeration. Compost is turned when the material in the first bin has undergone at least 7-10 days of composting after being capped off and the temperature has peaked (130-150º F) and begun to fall. Pathogen control is accomplished when temperatures of at least 130º F are reached through at least two heat cycles. The compost is re-aerated while being loaded into the secondary bin. To have adequate pathogen control, all compost must be turned at least once before spreading. Poultry mortality compost should not be fed to livestock and is not recommended for use on crops for human consumption.

**Incineration**

Incineration is one of the most biologically safe methods of mortality disposal with a resulting residue that does not create water quality problems. While sanitary and simple to operate, incinerators are expensive and can generate odors from gaseous and particulate emissions. During incineration, the entire carcass is be reduced to ashes which will not attract pests and can easily be dispersed. Loss of nutrient value from mortality for use on the farm is also a drawback of incineration. Incinerators must be permitted and meet all requirements of the U.S. Environmental Protection Agency and the Georgia EPD. Home-made incinerators are not acceptable and do not meet air pollution control standards. Future regulations on air quality may curtail widespread adoption of this technology.

**Rendering**

Rendering is a heating process that extracts recyclable ingredients such as protein and fat from animal tissue. Through this process, poultry mortalities can be converted into a valuable resource. Rendering is an approved method that may be useful to those who are located near a suitable rendering facility. Mortality that are taken to a rendering facility must:

1. Be delivered within 24 hours of death unless carcasses are refrigerated or frozen.
2. Be transported within covered, leak-proof containers.

Rendering is perhaps the most environmentally safe method of mortality management for poultry producers as it removes the mortality from the farm and relieves the grower of environmental concerns related to other methods of mortality management. Through rendering, mortality is recycled into a valuable, biologically safe protein by-product. There are, however, substantial risks associated with this method, namely the potential spread of pathogens during the pickup and transport of dead poultry from one site to another. Adherence to strict sanitation and disinfection practices for transport vehicles and personnel can alleviate most biosecurity concerns. Purchase of a freezer for cold storage of carcasses is necessary unless they are delivered daily to a rendering plant. Cold storage containers must be animal and pest-proof.

**Alternative Methods**

Other, less common methods include: feeding fresh carcasses to alligators and fur animals, extrusion processing into animal feed, lactic acid fermentation, and anaerobic digestion. These methods have strengths and weaknesses, depending on technology availability, cost, permitting, and management considerations. Consult with your county agent if you wish to consider any of these options.

## OTHER FACTORS TO CONSIDER

**Economics**

Annual net cost can be used to compare mortality management methods. Researchers at Auburn University compared the costs of mortality disposal in a1995 publication. The following table and figure are the three predominant methods the researchers compared. They found that disposal pits had the lowest net cost per pound of carcass disposal at 3.68¢, followed by composting at 4.88¢ and incineration at 8.92¢. Net costs per pound of mortality decrease as the size of the operation increases. Although these comparisons were done using 1995 values, it is likely that the relative position of these methods using current cost factors are the same.

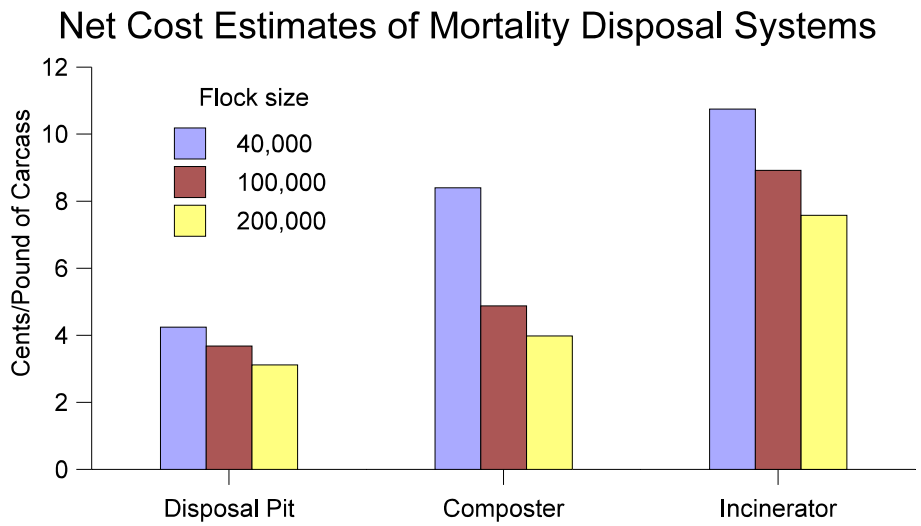
| Economic Analysis of Dead-Bird Disposal Systems For A Flock Size Of 100,000 Broilers | | | | | | |
|---|---|---|---|---|---|---|
| Item | Management Method | | | | | |
| | Disposal Pit | | Composter | | Incinerator | |
| | dollars | | | | | |
| | 1995[1] | 2002[2] | 1995[1] | 2002[2] | 1995[1] | 2002[2] |
| Initial investment cost ($) | 4,500 | 5,300 | 7,500 | 9,000 | 2,000 | 5,000 |
| Annual variable cost ($) | 1,378 | 1,526 | 3,281 | 3,806 | 4,833 | 5,992 |
| Annual fixed cost ($) | 829 | 920 | 1,658 | 1,656 | 522 | 920 |
| Total cost ($) | 2,207 | 2,546 | 4,939 | 5,462 | 5,355 | 6,682 |
| Value of by-product ($) | 0 | 0 | 2,010 | 2,010 | 0 | 0 |
| Annual net cost ($) | 2,207 | 2,546 | 2,929 | 3,452 | 5,355 | 6,682 |
| Cost per hundred-weight of carcass disposed ($) | 3.68 | 4.24 | 4.88 | 5.75 | 8.92 | 11.13 |

**Key production and financial assumptions (1995):**

| | | | |
|---|---|---|---|
| Average weight of carcass (lbs) | 2.00 | Mortality (percent) | 5.00 |
| Length of grow-out cycle (days) | 45.00 | Flocks per year | 6.00 |
| Cost of compost removal ($/ton) | 7.00 | Labor rate ($/hr.) | 5.00 |
| Value of straw ($/ton) | 60.00 | Fuel ($/gal.) | 0.62 |
| Value of litter ($/ton) | 20.00 | Tractor fuel ($/gal.) | 0.83 |
| Value of compost by-product ($/ton) | 20.00 | Cost of electricity ($/kwh) | 0.08 |

[1]Values based on Auburn research 1995.

[2]Values based on estimated increases in costs (Consumer Price Index) 1995-2002.




(Table and figure adapted from Crews, Donald and Blake, 1995.)

**Catastrophic Losses**

It is unlawful for any person to dispose of, or cause to be disposed of, dead poultry in any manner other than those approved methods. At times mortality levels may exceed that which can be handled on a daily basis. Having a secondary method of mortality disposal can help to process heavier than normal mortality. In the event of significant mortality losses due to disease, natural disaster, or other emergency situations, the commissioner of agriculture may approve the use of some other means of disposing of large quantities of dead birds. If a large volume of birds must be disposed of, burial is more economical than incineration.

Composting has also proven to be an acceptable method for massive mortality management. The principles of composting are the same with massive losses as with normal daily mortality. Following prescribed compost management practices and ingredient recommendations will provide for effective massive mortality composting. Siting of the compost windrow becomes a priority to prevent nutrient leaching and nuisance issues.

**Permitting**

All poultry production operations are required to have written approval or certificate by the Georgia Department of Agriculture for the disposal of dead poultry. Restrictions and usage guidelines for each disposal method are covered within the regulations by the Department. Approved methods and certificates of compliance are issued on a case by case basis as a grower selects the method and site location best suited for his particular operation. The Department shall approve the method and location for disposal at each location through a on-site visit by a departmental inspector.

Growers must submit a written request for a dead bird disposal permit to the state veterinarian at the following address:

Georgia Department of Agriculture
Animal Industry Division
19 M.L. King Jr. Drive
Room 106
Atlanta, GA 30334
404-656-3671

The letter requesting the permit should state the name that the producer wants to appear on the certificate of compliance and describe the disposal method of choice. It must also include any existing pit numbers where applicable. If the farm is new, this should be stated at the time of the request.

**Record Keeping**

Keeping records of mortality management is an important step in any nutrient management plan. Recording annual volume of mortality that is processed and the type of disposal method used will assist in documenting appropriate mortality disposal practices. The following information should be recorded and placed within your NMP notebook:

Annual mortality: _____ birds/yr

Disposal methods:

| | | | |
|---|---|---|---|
| Burial/Pit | _____% | Rendering | _____% |
| Composting | _____% | Other | _____% |
| Incineration | _____% | | |

Describe other methods: _____

Catastrophic mortality plan: _____
_____
_____

Dept. Agriculture Permit Number (if applicable):_____

There is not a simple answer to mortality disposal challenges and each poultry operation must select the method that is most suitable for their individual circumstances. Management ability, environmental conditions, and financial constraints each will dictate the type of disposal method that is most applicable. In all cases, mortality management should be recognized as a potential health hazard and as a regulated activity in Georgia. Growers must choose the permitted management method that best suits their individual situation. Standards and best management practices for each method must be strictly maintained to ensure sanitary conditions and minimal environmental impact.

References

Crews, J.R., J.O. Donald, and J.P. Blake, 1995. An Economic Evaluation of Dead-Bird Disposal Systems. Circular ANR-914, Alabama Cooperative Extension Service, Auburn University, Auburn, AL.

Damron, B.L., 2002. Options for Dead Bird Disposal. Fact Sheet AN-126, Florida Cooperative Extension Service, University of Florida, Gainesville, FL.

Donald, J.O., and J.P. Blake, 1996. Update on Bird Disposal Methods. Poultry Digest July 1996.

Poultry Water Quality Handbook, 1994. Poultry Water Quality Consortium, Chattanooga, TN.

Chapter 40-13-5 Dead Animal Disposal. Georgia Department of Agriculture Animal Industry Division.